

CLAIMS

1. An isolated nucleic acid molecule encoding a *Streptococcus pneumoniae* Hsp60.

2. An isolated nucleic acid molecule encoding a *Streptococcus pyogenes* Hsp60.

Sub C 3. An isolated nucleotide molecule selected from the group consisting of:
(a) an isolated nucleic acid molecule comprising the sequence of SEQ ID NO:1 from nucleotides 15-1652;
(b) an isolated nucleic acid molecule comprising the sequence of SEQ ID NO:3 from nucleotides 15-1640;
(c) an isolated nucleic acid molecule comprising the sequence of SEQ ID NO:5 from nucleotides 15-1649;
(d) an isolated nucleic acid molecule comprising the sequence of SEQ ID NO:7 from nucleotides 15-1652;
(e) an isolated nucleic acid molecule complementary to any one of the nucleotides of SEQ ID NOS:1, 3, 5 or 7 set forth in (a) through (d), respectively; and
(f) an isolated nucleic acid molecule that hybridizes under conditions of high stringency to the nucleic acid molecules of any one of (a) through (e).

4. An isolated nucleic acid molecule that specifically hybridizes to the nucleic acid molecule of any one of SEQ ID NO:1 from nucleotides 15-1652, SEQ ID NO:3 from nucleotides 15-1640, SEQ ID NO:5 from nucleotides 15-1649, or SEQ ID NO:7 from nucleotides 15-1652 or a complement thereof under conditions of high stringency.

Sub B 5. An isolated nucleic acid molecule comprising a nucleotide sequence that is identical to a segment comprising at least 25% of contiguous nucleotide bases of any one of SEQ ID NO:1 from nucleotides 15-1652, SEQ ID NO:3 from nucleotides 15-1640,

SEQ ID NO:5 from nucleotides 15-1649, or SEQ ID NO:7 from nucleotides 15-1652 or a complement thereof.

6. An isolated nucleic acid molecule encoding Hsp60 comprising a nucleic acid sequence that encodes a polypeptide comprising any one of SEQ ID NOS: 2, 4, 6 or 8 or a variant Hsp60 that is at least 95% homologous to a polypeptide according to any one of SEQ ID NOS: 2, 4, 6 or 8.

7. An isolated nucleic acid molecule according to claim 3, encoding a polypeptide that is able to be selectively bound by an antibody specific for a *Streptococcus pneumoniae* Hsp60 or a *Streptococcus pyogenes* Hsp60.

8. An isolated nucleic acid molecule encoding at least 8 amino acids of a Streptococcal Hsp60 polypeptide selected from amino acid residues 1-545 of SEQ ID NO:2, amino acid residues 1-541 of SEQ ID NO:4, amino acid residues 1-544 of SEQ ID NO:6, and amino acid residues 1-545 of SEQ ID NO:8, wherein the encoded Streptococcal Hsp60 polypeptide is able to bind to a major histocompatibility complex.

9. An isolated *Streptococcus pneumoniae* Hsp60 polypeptide.

10. An isolated *Streptococcus pyogenes* Hsp60 polypeptide.

11. An isolated Hsp60 polypeptide comprising the amino acid sequence of any one of a Streptococcal Hsp60 polypeptide selected from amino acid residues 1-545 of SEQ ID NO:2, amino acid residues 1-541 of SEQ ID NO:4, amino acid residues 1-544 of SEQ ID NO:6, and amino acid residues 1-545 of SEQ ID NO:8, or variants thereof, wherein the polypeptide is able to be selectively bound by an antibody specific for either a *Streptococcus pneumoniae* Hsp60 and/or *Streptococcus pyogenes* Hsp60.

12. The isolated Hsp60 polypeptide according to any one of claims 9-11, wherein the Hsp60 polypeptide is fused to an additional polypeptide to create a fusion protein.

13. An isolated Hsp60 polypeptide comprising at least 8 amino acids selected from amino acid residues 1-545 of SEQ ID NO:2, amino acid residues 1-541 of SEQ ID NO:4, amino acid residues 1-544 of SEQ ID NO:6, and amino acid residues 1-545 of SEQ ID NO:8, wherein the Hsp60 polypeptide is capable of binding to a major histocompatibility complex and eliciting or enhancing an immune response to *Streptococcus* in a human being.

14. The isolated Hsp60 polypeptide according to claim 11 wherein the polypeptide is derived from proteolytic cleavage.

15. The isolated Hsp60 polypeptide according to claim 11 wherein the polypeptide is derived from chemical synthesis.

16. The isolated Hsp60 according to claim 11 wherein the Hsp60 is an expression product of a transformed host cell containing a nucleic acid molecule encoding the Hsp60 or portion thereof.

17. The isolated Hsp60 polypeptide according to claim 11 wherein the polypeptide comprises greater than 95% homology to any one of a Streptococcal Hsp60 polypeptide selected from amino acid residues 1-545 of SEQ ID NO:2, amino acid residues 1-5410 of SEQ ID NO:4, amino acid residues 1-544 of SEQ ID NO:6, and amino acid residues 1-545 of SEQ ID NO:8, and wherein the Hsp60 polypeptide is able to be selectively bound by an antibody specific for either a *Streptococcus pneumoniae* Hsp60 or *Streptococcus pyogenes* Hsp60 or both.

18. An isolated polypeptide wherein the polypeptide is an expression product of a transformed host cell containing the nucleic acid molecule of any one of claims 1-8.

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SuB 19. A vector comprising an isolated nucleic acid molecule according to any one of claims 1-8.

SuB 20. The vector according to claim 19 wherein the vector is an expression vector comprising a promoter in operative linkage with the isolated nucleic acid molecule encoding the Hsp60 or portion thereof.

B 21. The vector according to claim 20, further comprising a selectable or identifiable marker.

22. The vector according to claim 20 wherein the promoter is a constitutive or an inducible promoter.

23. A host cell containing a vector according to claim 19.

24. The host cell according to claim 23 wherein the host cell is selected from the group consisting of a bacterial cell, a mammalian cell, a yeast cell and an insect cell.

25. A composition comprising an Hsp60 polypeptide of any one of claims 9-16 in combination with a pharmaceutically acceptable carrier or diluent.

26. The composition according to claim 25 wherein the composition is suitable for systemic administration.

27. The composition according to claim 25 wherein the composition is suitable for oral administration.

28. The composition according to claim 25 wherein the composition is suitable for parenteral administration.

29. A method for eliciting or enhancing an immune response in a mammal against *Streptococcus*, comprising administering to the mammal an effective amount of an Hsp60 polypeptide according to any one of claims 9-16 in combination with a pharmaceutically acceptable carrier or diluent.

30. A method for eliciting or enhancing an immune response in a mammal against a target antigen comprising administering to the mammal the target antigen joined to an Hsp60 polypeptide according to any one of claims 9-16 in combination with a pharmaceutically acceptable carrier or diluent.

Subs. 31. A composition comprising an isolated nucleic acid molecule of any one of claims 1-8 wherein the isolated nucleic acid molecule encodes a polypeptide having at least one amino acid difference from a corresponding polypeptide of an Hsp60 protein from an organism other than *Streptococcus*.

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